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(72) Inventor: **Islam, Anwarul**  
**New York 14226 (US)**

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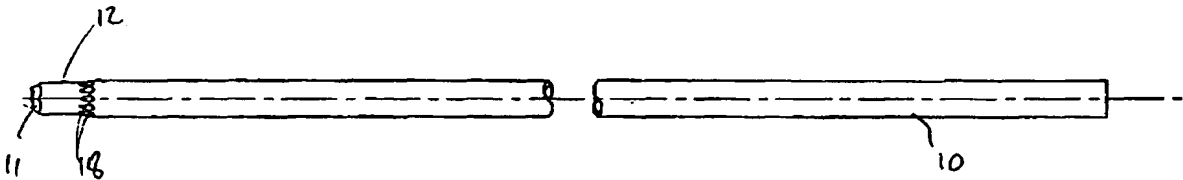
(74) Representative: **Gibson, Stewart Harry**  
**URQUHART-DYKES & LORD,**  
**Three Trinity Court,**  
**21-27 Newport Road**  
**Cardiff CF24 0AA (GB)**

(71) Applicant: **Islam, Anwarul**  
**New York 14226 (US)**

(54) **Bone marrow biopsy needle**

(57) A needle for use in taking a bone marrow biopsy comprises a hollow tube (10) having a front end portion

(12) formed to a reduced diameter by swaging. The front end is tapered by means of a number of circumferentially-spaced facets (11), forming a cutting edge.



**Figure 1**

**EP 1 210 911 A2**

## Description

[0001] The present invention relates to a biopsy needle for use in taking a bone marrow biopsy sample from posterior iliac crests.

[0002] UK patent No. 2,099,703 relates to a bone marrow biopsy needle assembly which comprises an elongate hollow needle having open front and rear ends, the front end being provided with a cutting edge: furthermore, a portion of the needle, adjacent its front end, is of a reduced internal diameter and an internal shoulder is formed between the inner end of this reduced-diameter portion and the main portion of the needle. The hollow needle is used with a trocar needle which is inserted into the hollow needle from its rear end, for a pointed front end of the trocar needle to project from the front end of the hollow needle.

[0003] In use, this assembly is gradually advanced, by hand, through the soft tissue and then through the cortical bone of the patient, by the execution of alternate clockwise and counterclockwise rotations of the assembly around its longitudinal axis. Once the assembly has advanced through the cortical bone, to reach the underlying spongy or medullary bone, the trocar needle is withdrawn from the hollow needle: then the hollow needle is advanced into the spongy bone, again by the execution of alternate clockwise and counterclockwise rotations or rotary motions of the hollow needle; it will be appreciated that a core sample of bone marrow will accordingly enter the hollow needle, from its front end. When the hollow needle has been advanced a sufficient depth into the spongy bone, about 20 to 25mm, the hollow needle is rotated several times to sever all the trabecular connections at its base and break the core sample loose from the spongy bone, and is then withdrawn. The core sample of bone marrow is retained within the hollow needle and this retention is particularly facilitated by the internal step which acts as a shoulder and also because of the fact that the core sample expands in diameter in the wider portion of the needle, inwardly or to the rear of the front end portion of reduced internal diameter. The core sample is subsequently removed from the hollow needle by inserting an elongate pusher rod into the hollow needle from its front end.

[0004] The above-described biopsy needle assembly is effective in use but it is necessary to make the hollow needle by hand, in order to provide its front end portion of reduced diameter: the hollow needle is accordingly expensive to manufacture.

[0005] In accordance with the present invention, there is provided a needle for use in taking a bone marrow biopsy, the needle comprising a hollow tube having a front end portion formed to a reduced diameter by swaging.

[0006] Preferably the front end of the hollow tube is formed with a cutting edge: preferably the front end of the hollow tube is tapered by means of a series of facets spaced apart around its circumference.

[0007] Preferably the outer surface of the hollow tube is formed with a series of flutes or serrations, spaced apart around its circumference, at a transition between its reduced-diameter front end portion and the main portion of the tube. These flutes or serrations serve for cutting the cortical bone, by alternate clockwise and counterclockwise rotations of the hollow needle, to allow the larger-diameter main portion of the needle to advance smoothly and without resistance through the cortical bone.

[0008] It will be appreciated that the above-defined hollow needle will be used with a trocar needle to form a biopsy needle assembly for use in taking a bone marrow biopsy. This biopsy needle assembly is used in the same manner as the assembly of the above-noted UK patent No. 2,099,703. However, the hollow needle does not have to be made by hand: the swaging process, to form the reduced-diameter front end portion of the hollow needle, may be carried out by machine and the hollow needle is therefore less expensive to manufacture.

[0009] Also in accordance with the present invention, there is provided a method of forming a needle for use in taking a bone marrow biopsy, the method comprising providing a hollow tube and swaging a front end portion of the tube to a reduced diameter.

[0010] An embodiment of the present invention will be described by way of example only and with reference to the accompanying drawings, in which:

FIGURE 1 is a side view of a hollow metal needle in accordance with the present invention, for use in a bone marrow biopsy needle assembly, the hollow needle being shown without its handle and without the trocar of the assembly;

FIGURE 2 is an enlarged longitudinal sectional view of the needle adjacent its front end; and

FIGURE 3 is a view showing use of the hollow needle when taking a bone marrow biopsy.

[0011] Referring to the drawings, there is shown a hollow needle for use in a disposable bone marrow biopsy needle assembly: the hollow needle comprises a stainless steel tube 10 of circular cross-section and uniform diameter a front end portion 12 of which has been formed to a reduced diameter by swaging. The front end of the tube 10 is tapered by means of six equi-angularly spaced facets 11, thus forming a cutting edge 14. The swaging process, for forming the front end portion to its reduced diameter, results in the formation of a generally frusto-conical transition portion 16 between the main portion of the tube 10 and the front end portion 12: the outer surface of this transition portion 16 is formed with twelve equi-angularly spaced flutes 18.

[0012] The biopsy needle assembly further comprises a trocar needle (not shown) for insertion into the hollow needle 10 from its rear end, such that the pointed end of the trocar needle projects from the front end of the hollow needle, in the same manner as the assembly of

UK patent No. 2,099,703: the hollow needle has a transverse handle attached to it at its end and the trocar has a domed handle attached to it at its rear end.

[0013] The biopsy needle assembly of the present invention is used in the same manner as the assembly of the above-noted UK patent. When the assembly reaches the spongy bone SB (Figure 3), the trocar needle is withdrawn. The hollow needle 10 is then advanced further, the flutes 18 on the transitional portion 16 serving to cut through the cortical bone CB, as the needle is turned alternately clockwise and anticlockwise, to allow the larger-diameter main portion of the hollow needle to pass through the cortical bone. When the hollow needle 10 has been advanced a sufficient depth into the spongy bone, the hollow needle is rotated several times to cut all the trabecular connections and break the core sample loose from its base, and is then withdrawn. Using this device, the core sample is retained within the hollow needle, this retention being facilitated by the internal step which acts as a shoulder and also because of the fact that the core sample expands in diameter in the wider internal portion of the needle, inwardly or to the rear of the transition portion 16.

[0014] In contrast to the biopsy needle of UK patent No. 2,099,703, the hollow needle 10 does not require to be made by hand: in particular, the swaging process, to form the reduced-diameter front end portion 12 may be carried out by machine; also, the tapering facets 11, to form the cutting edge 14, and the flutes 18 may all be formed by machine. The biopsy needle is accordingly relatively easy to manufacture, less expensive and more importantly enabling a large number of them to be produced in a short time span, which is essential where the needles are intended for single-use.

5. A biopsy needle assembly which comprises a needle as claimed in any preceding claim, together with a trocar needle for insertion into said hollow tube from its rear end such that the pointed front end of the trocar needle projects from the front end of said hollow tube.
6. A method of forming a needle for use in taking a bone marrow biopsy, the method comprising providing a hollow tube and swaging a front end portion of the tube to a reduced diameter.

## Claims

1. A needle for use in taking a bone marrow biopsy, the needle comprising a hollow tube having a front end portion formed to a reduced diameter by swaging.
2. A needle as claimed in claim 1, in which said front end of said hollow tube is formed with a cutting edge.
3. A needle as claimed in claim 2, in which said front end of said hollow tube is tapered by means of a series of facets spaced apart around its circumference.
4. A needle as claimed in any preceding claim, in which the outer surface of said hollow tube is formed with a series of flutes, spaced apart around its circumference, at a transition between its said reduced-diameter front end portion and the adjacent portion of the hollow tube.

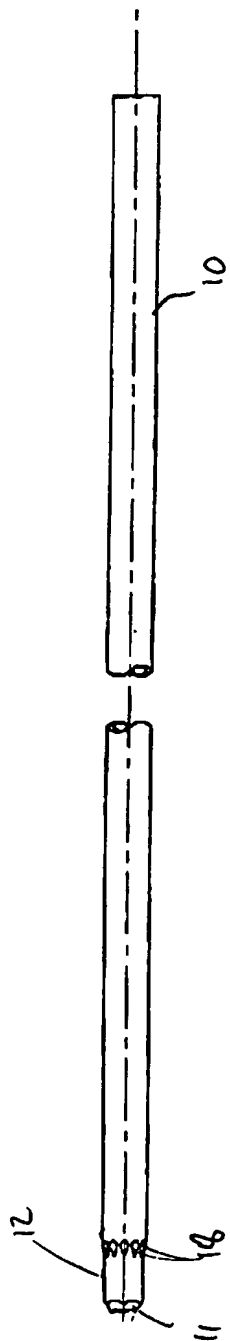


Figure 1

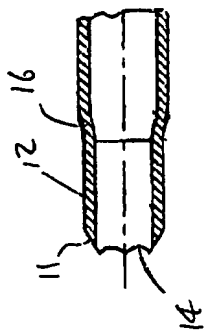


Figure 2

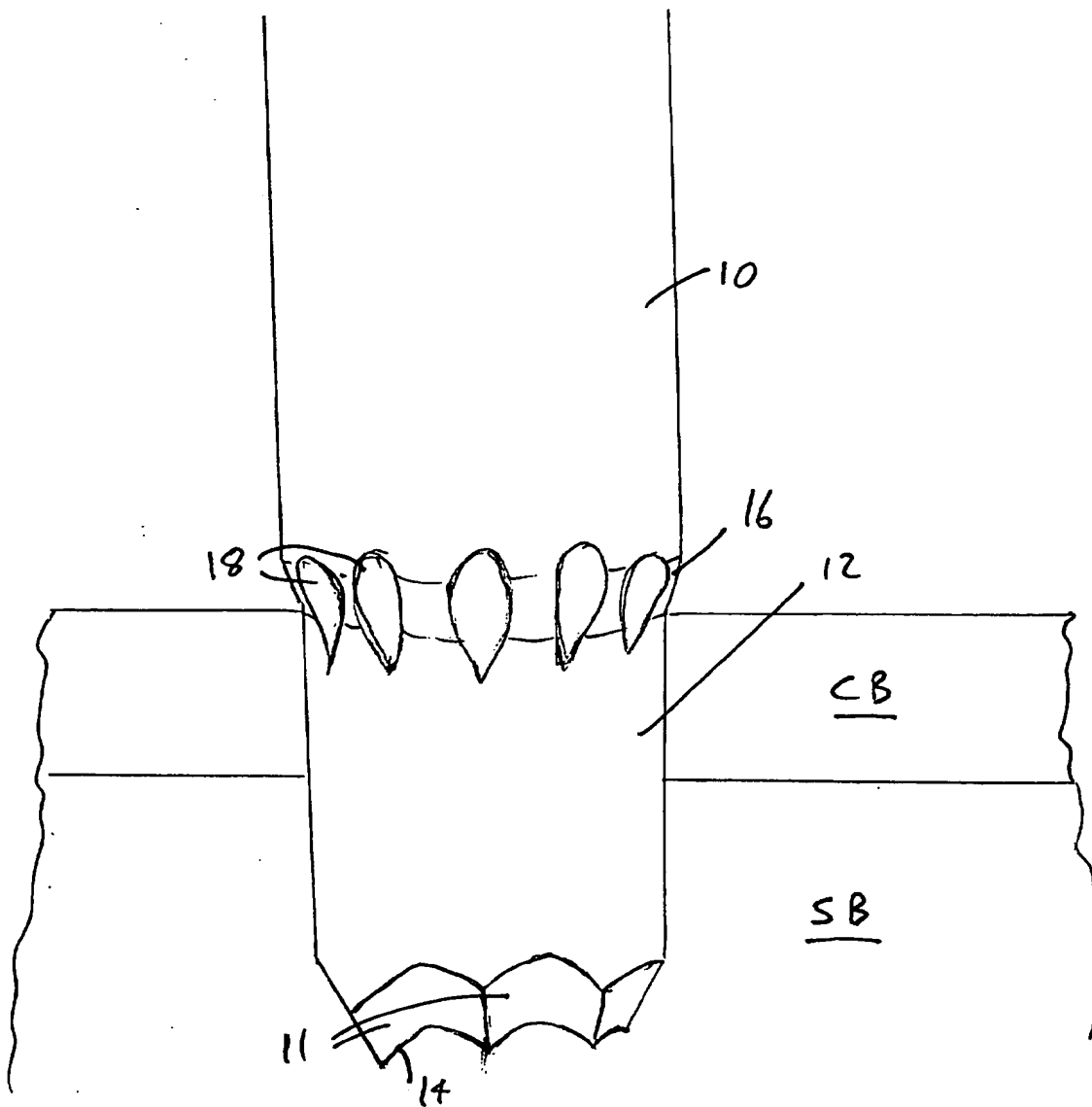


Figure 3